Online Appendix for MBER Issue 53

An Analysis of Pedagogical Approaches in Diverse Topical Areas

Appendix A

The Gordon Growth Model shown in Figure 1 is at the heart of the mathematical model for teaching stock valuation. This model can be described as follows:

Figure 1:
The Gordon Growth Model

$$P_0 = \frac{D_1}{k_s - g}$$

Where:
P_0 = the stock price at time period 0,
D_1 = the expected per share dividend at time period 1 (next year's dividend),
k_s = the required rate of return on the stock, and
g = the constant growth rate.

What determines the numerator, D_1? Dividends per share are supported by earnings. The model states:

$$D_1 = \frac{D_1}{EPS_1} \; x \; EPS_1$$

Thus, dividends per share, D_1, equals the payout ratio times earnings per share, EPS_1. The model assumes a constant payout ratio.

EPS come from the firm's income statement. Thus, all those things that determine earnings or net income go into determining EPS. This analysis can be carried back further if desired through pointing out that Sales equals Unit Price times Quantity, which links to the competitive structure of the industry and the firm's ability to set prices (or, must they be price takers) and the demand and market share of the firm. The firm's cost structure enters the picture. For example, recent efforts by many firms to reduce costs through layoffs and other means washes through to higher net income and EPS, which leads to higher dividends and stock prices.

Furthermore, the Capital Asset Pricing Model (CAPM) is used to illustrate the determination of k_s, the required rate of return on common stock. The CAPM gives an intuitive statement of the positive risk/return tradeoff. That model is shown in Figure 2.

Figure 2:
The Capital Asset Pricing Model (CAPM)

$$k_s = k_{RF} + \beta_s(k_M - k_{RF})$$

Where:
k_s = the required rate of return on the stock,
k_{RF}= the risk-free rate,
k_M = the market's rate of return, and
β_S = the equity beta of the stock, representing the stock's responsiveness to changes in the market.

The stock's beta coefficient, β_S, reflects both the business risk and the financial risk of the firm. The equation in Figure 3 below demonstrates three concepts (1) the separation of business and financial risk, (2) the tax subsidy of using debt, and (3) the effect of leverage on the stock's risk.

Figure 3:
Derived Mathematical Model

$$\beta_S = \beta_A\left(1 + \frac{D}{E}\right)(1 - t)$$

The previously unused terms in this equation are:

β_A = the asset beta, or the beta associated with the line of business of the firm, it's business risk,
D/E = the debt/equity ratio, a measure of financial leverage, and
t = the tax rate.

Also effecting k_S is the risk-free rate, k_{RF} which is determined by the real rate of interest, k*, and expected future inflation, $E(I_t)$.

Conceptually, we can see the impact of interest rates on a stock's rate of return and how that flows through to price by following the links from this equation to P_0. The real rate we can logically connect to business cycle effects causing variations in the supply and demand for capital. The impact of inflation on interest rates, and the flow through to stock price, P_0, is rather straight forward in the chart.

Now to the other part of the denominator: The determinant of the growth rate, g. The firm's growth is determined by the amount of money they retain for reinvestment and the rate of return they earn on those investments.

A conceptual framework for stock valuation has been presented thus far. A few examples, as

noted below, should help to cement the conceptual framework presented earlier.

Example 1: Why do stock prices fall when fear of rising inflation invades the market? For example, the CRB index of commodity prices unexpectedly rises. The bond and stock markets sell-off. We can follow it through the models to see the impact. Inflation appears as $E(I_t)$ in:

$$k_{RF} = k^* + E(I_t)$$

The simple follow through from inflation to stock price is:

$$E(I_t) \uparrow\rightarrow k_{RF} \uparrow\rightarrow k_S \uparrow\rightarrow P_0$$

Verbally: As expected inflation rises, interest rates will rise from the positive relation between inflation and interest rates (the Fisher effect), stock's rates will rise from the positive risk/return relationship, and finally stock prices will fall because of the inverse price/yield relationship. The above relationship explains the poor returns of the 1970s in a simple and straight forward manner.

Example 2: Now let us handle a more complex relationship. How can we explain a situation in which bond yields rise, but stock prices also rise?

Stock prices are affected by multiple forces: interest rates as reflected in the flow through to k, and through increases in corporate earnings as it flows through to D_1. There is also the impact through the growth rate, g, which is also positively related to stock price. The rise in interest rates may be offset by increases in the numerator and increases in g.

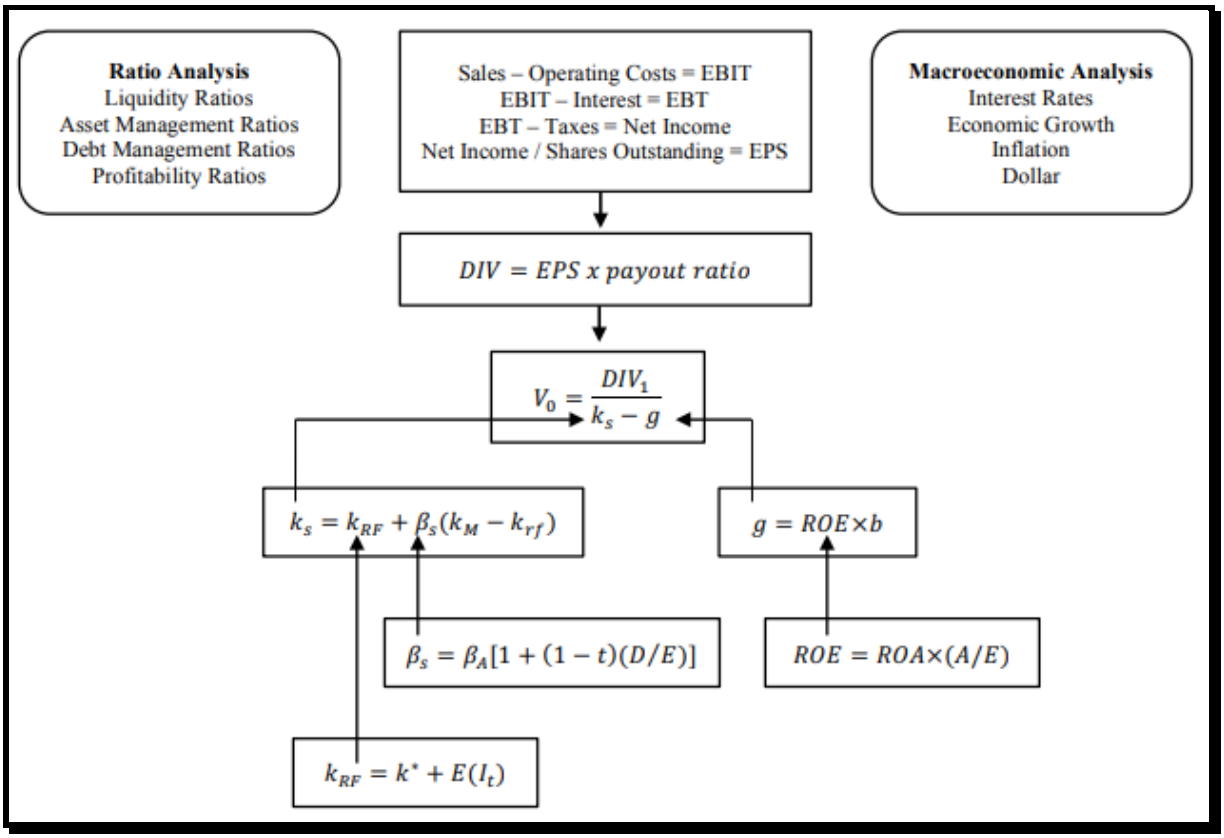
Example 3: The impact of leverage is perhaps the most complicated relationship because it flows through so many places. Suppose the firm increases its debt, how will stock price be affected? There is not a simple answer.

The intuitive answer is that proper use of debt can have a strong positive effect, but too much debt places an onerous burden on the borrower. For example, most of us need debt to buy a house, which both improves our current well-being and increases our long-term wealth. On the other hand, recent abuses in the mortgage market demonstrate the damage that can occur from too much debt.

No clear-cut answer comes from this analysis. The idea here is to provide a framework for discussion rather than to provide an absolute right or wrong answer. There are too many side effects to the leverage issue, and so it is not possible to come up with an absolute right or wrong answer.

Duncan, Anderson, Price, and Thomas (2017) developed a case study to illustrate how the Gordon Growth Model is employed to estimate the value of a firm's stock. In executing the case study, the author's instructions include handing out copies of Figure 4 to be used for discussion:

Figure 4:
The Gordon Growth Model Case Study Handout



Source: (Duncan et al., 2017)

Appendix B

Conceptual Map – The Big Picture

Each Core Course Has Some Impact On Organizational Performance

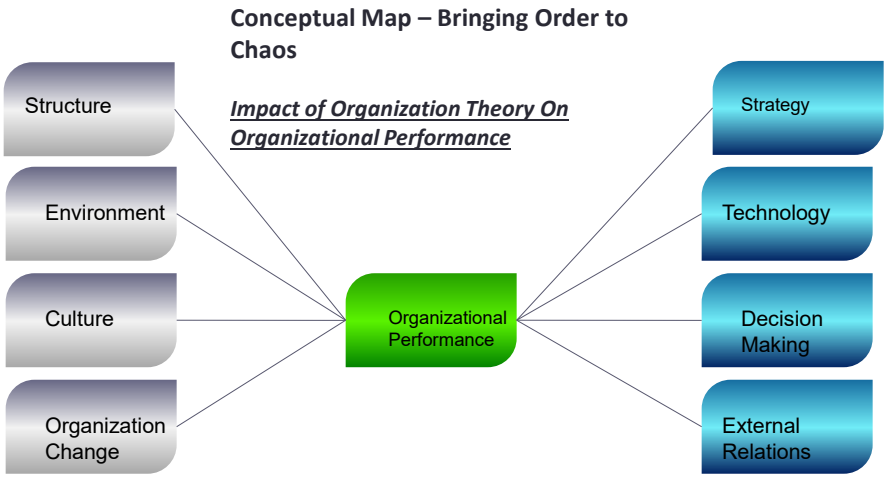
Conceptual Map – Within Course

Public HR Management Example

How Human Resource Management Impacts Organizational Performance

Chaos – Organization Theory Example

Factory, machine, family, Fayol, purpose, goals, social structure, motivation, Weber, strategy, decision making, McGregor, Maslow, Taylor, Family, Jungle, Sociology, Gulick, Isomorphism, culture, conflict, Simon, Technology, Katz and Kahn, Power, Authority, Change, Legitimacy, Hierarchy, Complexity, Environment, Open systems, Metaphors, Theater, Arena, Herzberg, Hannan and Freeman, Cyert and March, Meyer and Rowan, Formalization, Centralization, Communication, Professionalism, Standardization, Bureaucracy, Division of Labor, Structural inertia, the Garbage Can, Rationality, Reframing, Effectiveness, Closed systems, Barnard, Pfeffer



E-Transparency and Economic Performance: Evidence from Arkansas Counties

Appendix A: Components of Jordan and Harder E-transparency Score

Transparency Indicator	***Sub-Indicators***	***Rationale***
Budget	1. Current budget	Budgets inform citizens on government resources and how government intends to spend those resources
Elected officials	1. Name 2. Contact information(phone, e-mail address & location address 3. Responsibilities	Easy access to elected officials encourages regular dialogue
Administrative officials	1. Name 2. Contact information(phone, e-mail address & location address 3. Responsibilities	Administrative staff enforce ordinances and provide the services. Constituents need easy access to administrative staff so that they can dialogue with regarding the services provide.
Taxes	1. General information about taxes 2. County fee(s) 3. Form(s) available online	Disclosure of tax burdens accurately reflects the cost of living.
Meetings	1. Notices of public meetings (including time and place) 2. Minutes of past meetings 3. Meeting agendas for upcoming meetings	Meetings are one of the few ways constituents can participate in the decisions making process. Constituents need to know what elected officials intend to do.
Public records	1. General information about public records and where to obtain such 2. Name of person filling the records request 3. Contact information for that person	Easy access to public records deters government officials from engaging in dubious activities.
Crime records	1. Police reports 2. Sex offenders (name and address)	Constituents need to be informed about the safety of their county
Contracts/bidding	1. General information about the bidding process and government contracts 2. Rules governing contracts 3. Contracts for purchases over $10,000	Constituents need to know if the government is awarding contracts without favoritism
Job openings	1. General information about open position (s) 2. Title(s) and position descriptions	Open hiring process discourages nepotism
Audits	1. General information about auditing procedures 2. Report Results	Constituents need to know how prudently elected officials used the resources. Easy access to financial information pressures elected officials to be prudent in the use of resources.
Lobbying	1. General information about lobbying association(s)	Constituents need to know whether elected officials are making decisions that benefit the community and not lobbyists
Building permits and zoning	1. General information about process 2. Applications available online	Being open about the permit application process and adjustments reduces the likelihood of favoritism and bribery

Transparency Indicator	***Sub-Indicators***	***Rationale***
Foreign language access	1. Option to change the language of the website	Foreign language access ensures that more constituents have access and understand the information on the website.
Downloadable forms	1. Forms(s) for tax purposes, bidding, etc. in a variety of downloadable formats, i.e. Adobe documents, Word, Excel	Downloadable forms make it easier for constituents to access various forms without having to go to the government offices to collect them.
Interactivity functions	1. Comment box(es)	Interactivity functions helps constituents easily access various information on the website.
Search functions	1. Search bar(s) 2. Site Map	Search functions reduces the search cost for information on the website

Source: Jordan and Harder (2013)